

IN THE CLAIMS

1. (Previously Presented) In a multi-protocol label switching system (MPLS) data network comprised of a plurality of data switches that are interconnected to form a plurality of data paths from a source node to a destination node through a first set of data switches, a method of establishing a traffic flow over a protection path from a source switch to a destination switch through a second set of switches, said method comprises:

    sending a first predetermined message, from a first switch to a second switch, said first predetermined message establishing at least a working path and a protection path for the traffic flow through said network between said first and second switches;

    sending a second predetermined message, from said second switch to said first switch, said second predetermined message establishing a reverse notification path through said network between said second and said first switches; and

    sending a third message over said reverse notification path, from said second switch to said first switch, in response to the second switch receiving the traffic flow over the working path from the first switch in order to control protection switching by said first switch, the third message indicating whether the traffic flow sent on the working path was received intact and on time by the second switch.

2. (Previously Presented) The method of Claim 1 wherein sending a first predetermined message is comprised of the step of adding a protection messaging field to a label distribution protocol (LDP) message, said protection messaging field carrying protection pathway information between MPLS network switch elements.

3. (Previously Presented) The method of claim 1 wherein sending a first predetermined message is comprised of the step of adding a protection messaging field in an MPLS reservation protocol message (RSVP), said protection messaging field carrying protection pathway information between MPLS network switch elements.

4. (Previously Presented) The method of claim 1 wherein sending at least a first predetermined message from said first switch to a second switch establishing at least a working path and a protection path includes:

identifying at least one switch of an MPLS network as a switch element by the contents of at least one control field in a message field of an MPLS message;

sending said at least one control field to at least one switch of said MPLS network.

5. (Previously Presented) The method of claim 1 wherein sending at least a first predetermined message from said first switch to a second switch, said first predetermined message establishing at least a working path and a protection path through said network between said first and second switches includes:

identifying at least one switch of an MPLS network as a protection switch element by the contents of at least one control field in a message field of an MPLS message;

sending said at least one control field to at least one switch of said MPLS network.

6. (Previously Presented) The method of claim 1 further including the step of label binding said first predetermined message from said second switch to a third switch.

7. (Previously Presented) The method of claim 1 wherein said working path is set up loosely.

8. (Previously Presented) The method of claim 1 wherein said working path is set up explicitly.

9. (Previously Presented) The method of claim 1 further including the step of mapping labels to the traffic flow routed along said working path according to predetermined criteria that includes the quality of service to be granted the traffic flow.

10. (Previously Presented) In a multi-protocol label switching system (MPLS) data network comprised of a plurality of data switches that are interconnected to form a plurality of data paths from a source node to a destination node through said data switches, a method of routing traffic flow from a working path through said network to a protection path through said network, said method comprising:

sending a first predetermined control message, from a first switch to a second switch, said first predetermined control message establishing at least a working path and a separate protection path for the traffic flow through said network between said first and second switches;

sending a second predetermined control message, from said second switch to said first switch, said second predetermined message establishing a reverse notification path through said network between said second and said first switches; and

sending a third message over said reverse notification path from said second switch to said first switch in response to said second switch receiving the traffic flow from said first switch over the working path, the interruption of which controls protection switching by said first switch.

11. (Previously Presented) The method of claim 10 wherein sending a first predetermined control message comprises:

adding a protection messaging field to a label distribution protocol (LDP) message, said protection messaging field carrying protection pathway information between MPLS network switch elements.

12. (Previously Presented) The method of claim 10 wherein sending a first predetermined control message comprises:

adding a protection messaging field in an MPLS reservation protocol message (RSVP), said protection messaging field carrying protection pathway information between MPLS network switch elements.

13. (Previously Presented) The method of claim 10 wherein sending a first predetermined control message, from a first switch to a second switch, includes:

identifying at least one switch of said MPLS network as a protection switch element by the contents of at least one data field in a message field of an MPLS message;

sending said at least one data field to at least one switch of said MPLS network.

14. (Previously Presented) The method of claim 10 wherein said working path is set up loosely.

15. (Previously Presented) The method of claim 10 wherein said working path is set up explicitly.

16. (Previously Presented) The method of claim 10 further including:

mapping labels to the traffic flow routed along said working path according to predetermined criteria that includes the quality of service to be granted the traffic flow.

17. (Previously Presented) A system for establishing a traffic flow over a protection path in a data network, comprising:

a plurality of switches operable to route the traffic flow in the data network, a first one of the plurality of switches operable to establish a working path and a protection path, a second one of the plurality of switches that is downstream from the first one of the plurality of switches being on the working path, the second one of the plurality of switches operable to establish a reverse notification path to the first one of the plurality of switches, the second one of the plurality of switches operable to send a reverse notification message upstream to the first one of the plurality of switches in response to receiving the traffic flow from the first one of the plurality of switches over the working path, the reverse notification message operable to provide information related to the working path in order to determine whether the traffic flow is to be re-routed from the working path to the protection path.

18. (Previously Presented) The system of Claim 17, wherein the first one of the plurality of switches is a protection switch element, the first one of the plurality of switches operable to re-route the traffic flow onto the protection path in accordance with the reverse notification message.

19. (Previously Presented) The system of Claim 17, wherein the first one of the plurality of switches is operable to generate and send upstream its own reverse notification message, the reverse notification message of the first one of the plurality of switches operable to include information from the reverse notification message received from the second one of the plurality of switches.

20. (Previously Presented) The system of Claim 17, wherein the first one of the plurality of switches is operable to initiate re-routing of the traffic flow in response to not receiving the reverse notification message from the second one of the plurality of switches within a predetermined time interval.

21. (Previously Presented) The system of Claim 17, wherein the reverse notification message informs the first one of the plurality of switches of a status of the second one of the plurality of switches and any other ones of the plurality of switches downstream from the first one of the plurality of switches on the working path.

22. (Previously Presented) The system of Claim 17, wherein the second one of the plurality of switches is operable to send its reverse notification message directly to each of the plurality of switches.

23. (Previously Presented) The system of Claim 17, wherein the second one of the plurality of switches is operable to send its reverse notification message directly to a particular one of the plurality of switches that performs protection switching for the traffic flow from the working path to the protection path.

24. (Previously Presented) The system of Claim 23, wherein the reverse notification message of the second one of the plurality of switches includes information pertaining to a failure in the working path.